

What we claim is

1. A liquid crystal display device having a backlight being characterized in that the backlight has a first state in which the backlight outputs a first amount of light and a second state in which the backlight outputs a second amount of light, and the time for the first state and the time for the second state are controlled.

2. A liquid crystal display device having a backlight being characterized in that the backlight has a first state in which a first voltage is applied to the backlight and a second state in which a second voltage is applied to the backlight, and the time for the first state and the time for the second state are controlled.

3. A liquid crystal display device having a liquid crystal display panel which includes a plurality of scanning lines and a backlight being characterized in that a first voltage and a second voltage are applied at a given frame and the given frame is in synchronism with a frame to control a plurality of scanning lines.

4. A liquid crystal display device having a liquid crystal display panel and a backlight which is arranged at a back surface of the liquid crystal display panel being characterized in that the backlight is repeatedly subjected to lighting and extinguishing and includes means for controlling a comparison

of the lighting time and the extinguishing time.

5. A liquid crystal display device including a liquid crystal panel having switching elements which are driven with the supply of gate signals from gate signal lines and pixel electrodes to which drain signals are supplied from drain signal lines through the switching elements, and a backlight which is arranged on a back surface of the liquid crystal display panel in each pixel region on a liquid-crystal-side surface of one of respective substrates which are arranged to face each other in an opposed manner while sandwiching a liquid crystal therebetween, wherein

the backlight includes means which repeats the lighting and extinguishing in synchronism with the starting of the supply of scanning signals and controls the ratio between the lighting time and the extinguishing time.

6. A liquid crystal display device according to claim 3, wherein the lighting and the extinguishing of the backlight is performed once for each frame between a synchronous signal for data rewriting and a next synchronous signal for data rewriting.

7. A liquid crystal display device having a liquid crystal display panel and a backlight which is arranged on a back surface of the liquid crystal display panel, wherein

the liquid crystal display panel includes a liquid crystal display portion which is formed of a mass of a large number of pixels in the direction that liquid crystal interposed

between a pair of substrates expands and respective pixels have pixel electrodes to which video signals are independently supplied,

the liquid crystal display device includes detection means which detects the magnitude of the change of video signals to the pixel electrodes of respective pixel regions as the whole of the liquid crystal display portion, and

backlight blinking means which makes the backlight repeat the lighting and the extinguishing when it is detected by the detecting means that the change of the video signals is large.

8. A liquid crystal display device according to claim 7, wherein the liquid crystal display device includes backlight blinking control means which, when the change of the video signals detected by the detecting means is large, decreases the duty of the lighting time in response to the degree of the magnitude of the change of the video signals.

9. A liquid crystal display device according to claim 8, wherein the backlight blinking control means includes means which increases an electric current supplied to the backlight when the duty of the lighting time is small.

10. A liquid crystal display device having a liquid crystal display panel and a backlight which is arranged on a back surface of the liquid crystal display panel, wherein

the liquid crystal display panel includes a liquid crystal display portion which is formed of a mass of a large

number of pixels in the direction that liquid crystal interposed between a pair of substrates expands and respective pixels have pixel electrodes to which video signals are independently supplied,

the liquid crystal display device includes detection means which detects the magnitude of the change of video signals to the pixel electrodes of respective pixel regions as a region of a portion of the liquid crystal display portion, and

backlight blinking means which makes the backlight repeats the lighting and the extinguishing when it is detected by the detecting means that the change of the video signals is large.

11. A liquid crystal display device according to claim 10, wherein respective regions which are surrounded by gate signal lines which are extended in the x direction and are arranged in parallel in the y direction and drain signal lines which are extended in the y direction and are arranged in parallel in the x direction on a liquid-crystal-side surface of one substrate of the liquid crystal display panel are defined as pixel regions and each pixel region is provided with a switching element which is driven by scanning signals from a one-side gate signal line and a pixel electrode to which video signals are supplied from the drain signal line through the switching element, and

the region of the portion of the liquid crystal display

portion constitutes a region of a mass of respective pixel regions which are provided with pixel electrodes driven by some of the gate signal lines which are arranged close to each other.

12. A liquid crystal display device according to claim 11, wherein the region of the portion of the liquid crystal display portion constitutes a region of a mass of respective pixel regions which are provided with pixel electrodes driven by respective gate signal lines which run substantially at the center of the liquid crystal display portion.

13. A liquid crystal display device according to claim 11, wherein the region of the portion of the liquid crystal display portion constitutes a region of a mass of respective pixel regions which are provided with pixel electrodes driven by respective gate signal lines which run at least at one side except for substantially the center of the liquid crystal display portion.

14. A liquid crystal display device according to claim 10, wherein the liquid crystal display device includes backlight blinking control means which, when the change of the video signals detected by the detecting means is large, decreases the duty of the lighting time in response to the degree of the magnitude of the change of the video signals.

15. A liquid crystal display device according to claim 14, wherein the backlight blinking control means includes means which increases an electric current supplied to the backlight

when the duty of the lighting time is small.

16. A liquid crystal display device having a liquid crystal display panel and a backlight which is arranged on a back surface of the liquid crystal display panel, wherein

the liquid crystal display panel includes a liquid crystal display portion which is formed of a mass of a large number of pixels in the direction that liquid crystal interposed between a pair of substrates expands and respective pixels have pixel electrodes to which video signals are independently supplied and a counter electrode which generates an electric field in response to the video signals between the pixel electrodes and the counter electrode,

the liquid crystal display device includes detection means which detects the magnitude of video signals to the pixel electrodes of respective pixel regions as an average of the whole of the liquid crystal display portion when the video signals are large corresponding to the increase of the light transmittivity of the liquid crystal due to the electric field, and

backlight blinking means which makes the backlight repeat the lighting and the extinguishing when it is detected by the detecting means that the video signals become large.

17. A liquid crystal display device according to claim 16, wherein the liquid crystal display device includes backlight blinking control means which, when the video signals

detected by the detecting means are large, decreases the duty of the lighting time in response to the degree of the magnitude of the video signals.

18. A liquid crystal display device having a liquid crystal display panel and a backlight which is arranged on a back surface of the liquid crystal display panel, wherein

the backlight includes a plurality of linear light sources which are provided to a surface substantially parallel to a surface of the liquid crystal display panel, are extended in the x direction of the liquid crystal display panel and are arranged in parallel in the y direction, and

among respective light sources, at the time of performing the display driving, the light source arranged at a center portion repeats the lighting and the extinguishing and other remaining light sources maintain the lighting.

19. A liquid crystal display device according to claim 18, wherein respective regions which are surrounded by gate signal lines which are extended in the x direction and are arranged in parallel in the y direction and drain signal lines which are extended in the y direction and are arranged in parallel in the x direction on a liquid-crystal-side surface of one of substrates which are arranged to face each other in an opposed manner while sandwiching liquid crystal therebetween are defined as pixel regions and each pixel region is provided with a switching element which is driven by scanning signals

from one-side gate signal line and a pixel electrode to which video signals are supplied from the drain signal line through the switching element.

20. A liquid crystal display device according to claim 18, wherein to a portion which faces a plane determined by the respective light sources which repeat the lighting and the extinguishing out of a liquid crystal display portion formed of a mass of respective pixel regions of the liquid crystal display panel,

backlight blinking control means which detects the change of the video signals to the pixel electrodes of the respective pixel regions at the portion and increases the duty of the lighting time in response to the degree of magnitude of the change is provided.

21. A liquid crystal display device having a liquid crystal display panel and a backlight which is arranged on a back surface of the liquid crystal display panel, wherein

the backlight includes a plurality of linear light sources which are provided to a surface substantially parallel to a surface of the liquid crystal display panel, are extended in the x direction of the liquid crystal display panel and are arranged in parallel in the y direction, and

at the time of performing the display driving, the respective light sources repeat the lighting and the extinguishing and the duty of the lighting of the light source

arranged at a center portion is set smaller than the duty of the lighting of the remaining other light sources.

22. A liquid crystal display device having a liquid crystal display panel in which respective pixel groups to which video signals are supplied are selected in response to scanning signals supplied to gate signal lines and a backlight which is arranged on a back surface of the liquid crystal display panel, wherein

the backlight includes a plurality of linear light sources which are provided to a surface substantially parallel to a surface of the liquid crystal display panel, are extended in the direction parallel to the gate signal lines and are arranged in parallel in the direction which intersects the direction parallel to the gate signal lines, and

the light source arranged at least at a center portion repeats the lighting and the extinguishing and the light source disposed at least at one of both sides of the center portion maintains the lighting.

23. A liquid crystal display device having a liquid crystal display panel in which respective pixel groups to which video signals are supplied are selected in response to scanning signals supplied to gate signal lines and a backlight which is arranged on a back surface of the liquid crystal display panel, wherein

the backlight includes a plurality of linear light

sources which are provided to a surface substantially parallel to a surface of the liquid crystal display panel, are extended in the direction parallel to the gate signal lines and are arranged in parallel in the direction which intersects the direction parallel to the gate signal lines, and

at the time of performing the sequential display of respective frames of the liquid crystal display panel, for each frame, the light source arranged at least at a center portion repeats the lighting and the extinguishing without changing a phase and the light source disposed at least at one of both sides of the center portion repeats the lighting and the extinguishing while shifting the phase.

24. A liquid crystal display device having a liquid crystal display panel in which respective pixel groups to which video signals are supplied are selected in response to scanning signals supplied to gate signal lines and a backlight which is arranged on a back surface of the liquid crystal display panel, wherein

the backlight includes a plurality of linear light sources which are provided to a surface substantially parallel to a surface of the liquid crystal display panel, are extended in the direction parallel to the gate signal lines and are arranged in parallel in the direction which intersects the direction parallel to the gate signal lines, and

each light source repeats the lighting and the

extinguishing at the same frequency and the frequency of the lighting and extinguishing of the light source disposed at least at a center portion is set smaller than the frequency of the lighting and extinguishing of the light sources disposed at least at one of both sides of the center portion.

25. A liquid crystal display device having a liquid crystal display panel in which respective pixel groups to which video signals are supplied are selected in response to scanning signals supplied to gate signal lines and a backlight which is arranged on a back surface of the liquid crystal display panel, wherein

the backlight includes a plurality of linear light sources which are provided to a surface substantially parallel to a surface of the liquid crystal display panel, are extended in the direction parallel to the gate signal lines and are arranged in parallel in the direction which intersects the direction parallel to the gate signal lines, and

each light source repeats the lighting and the extinguishing and the duty of the lighting of the light source disposed at at least a center portion is set smaller than the duty of the lighting of the light sources disposed at least at one of both sides of the center portion.

26. A liquid crystal display device having a liquid crystal display panel in which respective pixel groups to which video signals are supplied are selected in response to scanning

signals supplied to gate signal lines and a backlight which is arranged on a back surface of the liquid crystal display panel, wherein

the backlight includes a plurality of linear light sources which are provided to a surface substantially parallel to a surface of the liquid crystal display panel, are extended in the direction parallel to the gate signal lines and are arranged in parallel in the direction which intersects the direction parallel to the gate signal lines, and

the light source disposed at least at a center portion repeats the lighting and the extinguishing and the light source disposed at least at one of both sides of the center portion maintains the lighting and also receives a less amount of a supply current or a supply voltage than the light source disposed at the center portion.

27. A liquid crystal display device having a liquid crystal display panel in which respective pixel groups to which video signals are supplied are selected in response to scanning signals supplied to gate signal lines and a backlight which is arranged on a back surface of the liquid crystal display panel, wherein

the backlight includes a plurality of linear light sources which are provided to a surface substantially parallel to a surface of the liquid crystal display panel, are extended in the direction parallel to the gate signal lines and are

arranged in parallel in the direction which intersects the direction parallel to the gate signal lines, and

the light sources disposed at least a center portion repeat the lighting and the extinguishing and the light source disposed at least at one of both sides of the center portion maintains the lighting, and

an arrangement pitch between the light sources disposed at least at one of both sides of the center portion is set larger than an arrangement pitch between the neighboring other light sources.

28. A liquid crystal display device having a liquid crystal display panel in which respective pixel groups to which video signals are supplied are selected in response to scanning signals supplied to gate signal lines and a backlight which is arranged on a back surface of the liquid crystal display panel, wherein

the backlight includes a plurality of linear light sources which are provided to a surface substantially parallel to a surface of the liquid crystal display panel, are extended in the direction parallel to the gate signal lines and are arranged in parallel in the direction which intersects the direction parallel to the gate signal lines, and

the light source disposed at least a center portion repeats the lighting and the extinguishing and the light source disposed at least at one of both sides of the center portion

maintains the lighting, and

at least one of the light source disposed at the center portion and one of the light sources disposed at least at one of both sides of the light source disposed at the center portion are capable of controlling the magnitude of a supply current or a supply voltage.

29. A liquid crystal display device having a liquid crystal display panel in which respective pixel groups to which video signals are supplied are selected in response to scanning signals supplied to gate signal lines and a backlight which is arranged on a back surface of the liquid crystal display panel, wherein

the backlight includes a plurality of linear light sources which are provided to a surface substantially parallel to a surface of the liquid crystal display panel, are extended in the direction parallel to the gate signal lines and are arranged in parallel in the direction which intersects the direction parallel to the gate signal lines, and

at least one of the light source disposed at a center portion and the light source disposed at least at one of both sides of the light source disposed at the center portion is capable of controlling the duty of the lighting relative to the extinguishing.

30. A liquid crystal display device having a liquid crystal display panel and a backlight, the backlight being

capable of repeating the lighting and the extinguishing, and the liquid crystal display device being capable of changing over a display mode between a motion picture display mode and a still picture display mode and performing the lighting and extinguishing of the backlight in the motion picture display mode, wherein

the frequency of rewriting image at the time of the motion picture display mode is set higher than the frequency of rewriting image at the time of the still picture display mode.

31. A liquid crystal display device according to any one of claims 1 to 30, wherein the liquid crystal display device includes a mode which enables the display of a motion picture and a still picture by changing over them and the lighting and the extinguishing of the backlight are repeated in the motion picture display mode.

32. A liquid crystal display device having a liquid crystal display panel which includes a plurality of scanning lines and a backlight, wherein

the backlight is constituted to irradiate a plurality of amounts of light which differ along with the lapse of time within a frame in which a plurality of the above-mentioned scanning lines are controlled to the liquid crystal display panel side.

33. A liquid crystal display device according to claim 32, wherein a plurality of amounts of light consists of a first amount of light, a second amount of light and a third amount

of light and at least the length of time of one of these amounts of light can be controlled.

34. A liquid crystal display device having a liquid crystal display panel which includes a plurality of scanning lines and a backlight which has a plurality of light sources arranged parallel to a virtual surface which is substantially parallel to the liquid crystal display panel, wherein

the lighting and the extinguishing of a plurality of these light sources are repeated after the starting of supply of scanning signals and at least one light source is lit with a delay of at least one frame which controls the scanning signals.

35. A liquid crystal display device according to claim 34, wherein the lighting of the light source which is lit with the delay has the time integral value of the frame for controlling the scanning lines which is substantially equal to the time integral value of other frame for controlling the lighting of other light source or the scanning lines.

36. A liquid crystal display device according to claim 34, wherein the delay is set within a range from minus 8 ms to plus 8 ms from the starting point of supply of the scanning signals.

37. A liquid crystal display device having a liquid crystal display panel which includes a plurality of scanning lines and a backlight, wherein

the backlight is configured to irradiate a plurality of

amounts of light which differ along with the lapse of time within a frame in which a plurality of scanning lines are controlled to the liquid crystal display panel side, and

in performing screen scanning in plural times, the scanning is performed such that the screen becomes a black display in one screen scanning.

38. A liquid crystal display device having a liquid crystal display panel which includes a plurality of scanning lines and a backlight includes a plurality of light sources which are arranged in the extended direction of the scanning lines and are extended in the direction which intersects the scanning extending direction within a virtual plane which is parallel to the liquid crystal display panel, wherein

in performing screen scanning in plural times, the scanning is performed such that the screen becomes a black display in one screen scanning, and

a frame in which an amount of light is changed is repeated with respect to at least one of respective light sources within the frame of scanning.

39. A liquid crystal display device having a liquid crystal display panel which include a plurality of scanning lines and a backlight which includes a plurality of light sources which are arranged in the direction of the extending scanning lines and are extended in the direction which intersects the scanning extending direction within a virtual

plane which is parallel to the liquid crystal display panel,
in performing screen scanning in plural times, the
scanning is performed such that the screen becomes a black
display in one screen scanning, and

a frame in which an amount of light is changed is repeated
with respect to respective light sources within the frame of
scanning and an amount of light of at least one of the light
sources is minimized.

40. A liquid crystal display device according to claim
38, wherein the delay of the change starting period of an amount
of light is delayed with respect to the light sources in the
frame of the screen scanning.

41. A liquid crystal display device according to claim
38, wherein the change starting period of an amount of light
is substantially equal with respect to the light sources in the
frame of the screen scanning.